Cumulative energy demand as predictor for the environmental burden of commodity production

Mark, A.J. Huijbregts[*†], *Stefanie Hellweg*[‡], *Rolf Frischknecht*[§], *Harrie W.M. Hendriks*[⊥], *Konrad Hungerbühler*[††], *A. Jan Hendriks*[†]

† Department of Environmental Science, Institute for Wetland and Water Research, Faculty of Science, Radboud University Nijmegen, The Netherlands

‡ Institute of Environmental Engineering, ETH Zurich, Switzerland

§ ESU Services, Kanzleistrasse 4, 8610 Uster, Switzerland;

⊥ Department of Mathematics, Faculty of Science, Radboud University Nijmegen, P.O. Box 9010, NL-6500 GL Nijmegen, The Netherlands;

†† Institute for Chemical- and Bioengineering, ETH Zurich, CH-8093 Zürich, Switzerland

SUPPORTING INFORMATION

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Table S1: Commodities which are specifically adapted in the 'without fossil energy scenario'.

#	Production process	Adaptation
1	Ammonia, partial oxidation, liquid, at plant/RER	Emissions related to fossil heat production are removed
2	Ammonia, steam reforming, liquid, at plant/RER	Emissions related to fossil heat production are removed
3	Corrugated board, fresh fibre, single wall, at plant/kg/RER	Emissions related to fossil heat production are removed
4	Corrugated board, mixed fibre, single wall, at plant/kg/RER	Emissions related to fossil heat production are removed
5	Corrugated board, recycling fibre, double wall, at plant/kg/RER	Emissions related to fossil heat production are removed
6	Corrugated board, recycling fibre, single wall, at plant/kg/RER	Emissions related to fossil heat production are removed
7	Silicon carbide, at plant/RER	Emissions related to fossil heat production are removed
8	Compost, at plant/CH	Emissions related to fossil heat production are removed while biogenic emissions are maintained
9	Liquid packaging board, at plant/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
10	Solid bleached board, SBB, at plant/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
11	Solid unbleached board, SUB, at plant/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
12	Whitelined chipboard, WLC, at plant/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
13	Sulphate pulp, ECF bleached, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
14	Sulphate pulp, TCF bleached, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
15	Sulphate pulp, unbleached, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
16	Kraft paper, unbleached, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
17	Paper, newsprint, 0% DIP, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
18	Paper, newsprint, at plant/kg/CH	Emissions related to fossil heat production are removed while biogenic emissions are maintained
19	Paper, newsprint, DIP containing, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
2	Paper, woodfree, coated, at integrated	Emissions related to fossil heat production are

#	Production process	Adaptation
0	mill/kg/RER	removed while biogenic emissions are maintained
2 1	Paper, woodfree, uncoated, at integrated mill/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
2 2	Corrugated board base paper, kraftliner, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
2 3	Corrugated board base paper, semichemical fluting, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
2 4	Corrugated board base paper, testliner, at plant/kg/RER	Emissions fully related to fossil heat production and removed
2 5	Corrugated board base paper, wellenstoff, at plant/kg/RER	Emissions related to fossil heat production are removed while biogenic emissions are maintained
2 6	Carbon black, at plant/GLO	Fossil fuel-related emissions removed (CO_2, CO, NO_x, particulates, polycyclic aromatic hydrocarbons, and SO_2)
2 7	MG-silicon, at plant/NO	Fossil fuel-related emissions removed (CO_2, NO_x and SO_2)
2 8	Tube insulation, elastomere, at plant/DE	Fossil fuel-related emissions removed (CO_2, CO, NO_x, particulates, and SO_2)
2 9	Flat glass, uncoated, at plant/RER	Air emissions, except tin and lead and geogenic CO_2, removed
3 0	Flat glass, coated, at plant/RER	Air emissions, except geogenic CO_2, removed
3 1	Packaging glass, brown, at plant/RER	Air emissions, except geogenic CO_2, removed
3 2	Packaging glass, green, at plant/RER	Air emissions, except geogenic CO_2, removed
3 3	Packaging glass, white, at plant/RER	Air emissions, except geogenic CO_2, removed
3 4	Clinker, at plant/CH	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
3 5	Brick, at plant/CH	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
3 6	Expanded clay, at plant/DE	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
3 7	Lime, hydraulic, at plant/CH	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed

#	Production process	Adaptation
38	Cast iron, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
39	Pig iron, at plant/GLO	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
40	Pellets, iron, at plant/GLO	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
41	Sinter, iron, at plant/GLO	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
42	Rock wool, at plant/CH	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
43	Roof tile, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
44	Steel, converter, chromium steel 18/8, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
45	Steel, converter, low-alloyed, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
46	Steel, converter, unalloyed, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
47	Steel, electric, chromium steel 18/8, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
48	Steel, electric, un- and low-alloyed, at plant/RER	Energy carrier is burnt together with the material itself. An equal share of 50% of all air emissions is allocated to fossil fuels and removed
49	Hydrogen cyanide, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
50	Hydrogen, cracking, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
51	Acetone cyanohydrin, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only

#	Production process	Adaptation
52	Acetone, liquid, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
53	Acrylonitrile, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
54	Benzene, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
55	Butadiene, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
56	Butene, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
57	Epoxy resine, liquid, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
58	Ethylene, average, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
59	Ethylene, pipeline system, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
60	Methyl methacrylate, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
61	Pentane, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
62	Polyols, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
63	Propylene, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
64	Styrene, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
65	Toluene diisocyanate, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
66	Toluene liquid, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
67	Vinyl chloride, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
68	Xylene, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
69	Polybutadiene, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
70	Nylon 6, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
71	Styrene-acrylonitrile copolymer, SAN, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only

#	Production process	Adaptation
72	Nylon 6, glass-filled, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
73	Nylon 66, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
74	Nylon 66, glass-filled, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
75	Polycarbonate, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
76	Polyethylene, HDPE, granulate, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
77	Polyethylene, LDPE, granulate, at plant/kg/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
78	Polyethylene, LLDPE, granulate, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
79	Polymethyl methacrylate, beads, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
80	Polymethyl methacrylate, sheet, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
81	Polypropylene, granulate, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
82	Polystyrene, expandable, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
83	Polystyrene, general purpose, GPPS, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
84	Polystyrene, high impact, HIPS, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
85	Polyvinylchloride, bulk polymerised, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
86	Polyvinylchloride, emulsion polymerised, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
87	Polyvinylchloride, suspension polymerised, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only
88	Polyvinylidenchloride, granulate, at plant/RER	Process-specific, biomass-related and/or fugitive emissions and waste included only

Table S2: Commodities included in the method comparison. DE = Germany; CH = Switzerland; GLO = Global; MY = Malaysia; NL = Netherlands; NO = Norway; RER = Europe; US = United States of America; ZA = South Africa;

Commodity	Group
Barley grains extensive, at farm/CH	agricultural product
Barley grains IP, at farm/CH	agricultural product
Barley grains organic, at farm/CH	agricultural product
Barley seed IP, at regional storehouse/CH	agricultural product
Barley seed organic, at regional storehouse/CH	agricultural product
Barley straw extensive, at farm/CH	agricultural product
Barley straw IP, at farm/CH	agricultural product
Barley straw organic, at farm/CH	agricultural product
Clover seed IP, at regional storehouse/CH	agricultural product
Crude coco nut oil, at plant/PH U	agricultural product
Crude palm kernel oil, at plant/MY	agricultural product
Crude palm oil, at plant/MY	agricultural product
Fava beans IP, at farm/CH	agricultural product
Fava beans organic, at farm/CH	agricultural product
Fodder beets IP, at farm/CH	agricultural product
Fresh fruit bunch harvesting, at farm/MY	agricultural product
Grain maize IP, at farm/CH	agricultural product
Grain maize organic, at farm/CH	agricultural product
Grass seed IP, at regional storehouse/CH	agricultural product
Hay extensive, at farm/CH	agricultural product
Hay intensive IP, at farm/CH	agricultural product
Hay intensive organic, at farm/CH	agricultural product
Maize seed IP, at regional storehouse/CH	agricultural product
Maize seed organic, at regional storehouse/CH	agricultural product
Maize starch, at plant/DE	agricultural product
Pea seed IP, at regional storehouse/CH	agricultural product
Pea seed organic, at regional storehouse/CH	agricultural product
Potato seed IP, at regional storehouse/CH	agricultural product
Potato seed organic, at regional storehouse/CH	agricultural product
Potato starch, at plant/DE	agricultural product
Potatoes IP, at farm/CH	agricultural product
Potatoes organic, at farm/CH	agricultural product
Protein peas, IP, at farm/CH	agricultural product

Commodity	Group
Protein peas, organic, at farm/CH	agricultural product
Rape seed extensive, at farm/CH	agricultural product
Rape seed IP, at farm/CH	agricultural product
Rape seed IP, at regional storehouse/CH	agricultural product
Rye grains extensive, at farm/CH	agricultural product
Rye grains IP, at farm/CH	agricultural product
Rye grains organic, at farm/CH	agricultural product
Rye seed IP, at regional storehouse/CH	agricultural product
Rye seed organic, at regional storehouse/CH	agricultural product
Rye straw extensive, at farm/CH	agricultural product
Rye straw IP, at farm/CH	agricultural product
Rye straw organic, at farm/CH	agricultural product
Silage maize IP, at farm/CH	agricultural product
Silage maize organic, at farm/CH	agricultural product
Soy beans IP, at farm/CH	agricultural product
Soy beans organic, at farm/CH	agricultural product
Soya oil, at plant/RER	agricultural product
Soya scrap, at plant/RER	agricultural product
Straw IP, at farm/CH	agricultural product
Straw organic, at farm/CH	agricultural product
Sugar beet seed IP, at regional storehouse/CH	agricultural product
Sugar beets IP, at farm/CH	agricultural product
Sunflower IP, at farm/CH	agricultural product
Tallow, at plant/CH	agricultural product
Wheat grains extensive, at farm/CH	agricultural product
Wheat grains IP, at farm/CH	agricultural product
Wheat grains organic, at farm/CH	agricultural product
Wheat seed IP, at regional storehouse/CH	agricultural product
Wheat seed organic, at regional storehouse/CH	agricultural product
Wheat straw extensive, at farm/CH	agricultural product
Wheat straw IP, at farm/CH	agricultural product
Wheat straw organic, at farm/CH	agricultural product
Autoclaved aerated concrete block, at plant/CH	construction materials
Base plaster, at plant/CH	construction materials
Bitumen, at refinery/RER	construction materials
Blast furnace slag cement, at plant/CH	construction materials

Commodity	Group
Brick, at plant/RER	construction materials
Cellulose fibre, inclusive blowing in, at plant/CH	construction materials
Cement cast plaster floor, at plant/CH	construction materials
Cement mortar, at plant/CH	construction materials
Clay plaster, at plant/CH	construction materials
Clinker, at plant/CH	construction materials
Cobwork, at plant/CH	construction materials
Concrete block, at plant/DE	construction materials
Cork slab, at plant/RER	construction materials
Cover coat, mineral, at plant/CH	construction materials
Foam glass, at plant/CH	construction materials
Glass wool mat, at plant/CH	construction materials
Gypsum fibre board, at plant/CH	construction materials
Light clay brick, at plant/DE	construction materials
Light mortar, at plant/CH	construction materials
Lightweight concrete block, expanded clay, at plant/CH	construction materials
Lightweight concrete block, expanded perlite, at plant/CH	construction materials
Lightweight concrete block, expanded vermiculite, at plant/CH	construction materials
Lightweight concrete block, polystyrene, at plant/CH	construction materials
Lightweight concrete block, pumice, at plant/DE	construction materials
Lime mortar, at plant/CH	construction materials
Polystyrene foam slab, at plant/RER	construction materials
Portland calcareous cement, at plant/CH	construction materials
Portland cement, strength class Z 42.5, at plant/CH	construction materials
Portland cement, strength class Z 52.5, at plant/CH	construction materials
Portland slag sand cement, at plant/CH	construction materials
Quicklime, milled, packed, at plant/CH	construction materials
Refractory, basic, packed, at plant/DE	construction materials
Refractory, fireclay, packed, at plant/DE	construction materials
Refractory, high aluminium oxide, packed, at plant/DE	construction materials
Rock wool, at plant/CH	construction materials
Roof tile, at plant/RER	construction materials
Sand-lime brick, at plant/DE	construction materials
Stucco, at plant/CH	construction materials
Thermal plaster, at plant/CH	construction materials
Tube insulation, elastomere, at plant/DE	construction materials

Commodity	Group
Urea formaldehyde foam slab, hard, at plant/CH	construction materials
Urea formaldehyde foam, in situ foaming, at plant/CH	construction materials
Flat glass, coated, at plant/RER	glass
Flat glass, uncoated, at plant/RER	glass
Glass fibre, at plant/RER	glass
Glass tube, borosilicate, at plant/DE	glass
Glass, cullets, sorted, at sorting plant/RER	glass
Glass, from public collection, unsorted/RER	glass
Packaging glass, brown, at plant/RER	glass
Packaging glass, green, at plant/RER	glass
Packaging glass, white, at plant/RER	glass
Solar collector glass tube, with silver mirror, at plant/DE	glass
Solar glass, low-iron, at regional storage/RER	glass
Acetic acid, 98% in H2O, at plant/RER	inorganic chemicals
Acrylic acid, at plant/RER	inorganic chemicals
Adipic acid, at plant/RER	inorganic chemicals
Aluminium fluoride, at plant/RER	inorganic chemicals
Aluminium hydroxide, at plant/RER	inorganic chemicals
Aluminium oxide, at plant/RER	inorganic chemicals
Aluminium sulphate, powder, at plant/RER	inorganic chemicals
Ammonia, partial oxidation, liquid, at plant/RER	inorganic chemicals
Ammonia, steam reforming, liquid, at plant/RER	inorganic chemicals
Ammonium bicarbonate, at plant/RER	inorganic chemicals
Ammonium nitrate phosphate, as N, at regional storehouse/RER	inorganic chemicals
Ammonium nitrate phosphate, as P2O5, at regional storehouse/RER	inorganic chemicals
Ammonium nitrate, as N, at regional storehouse/RER	inorganic chemicals
Ammonium sulphate, as N, at regional storehouse/RER	inorganic chemicals
Anhydrite, at plant/CH	inorganic chemicals
Argon, liquid, at plant/RER	inorganic chemicals
Barite, at plant/RER	inorganic chemicals
Bentonite, at processing/DE	inorganic chemicals
Borax, anhydrous, powder, at plant/RER	inorganic chemicals
Boric acid, anhydrous, powder, at plant/RER	inorganic chemicals
Calcareous marl, at plant/CH	inorganic chemicals
Calcium ammonium nitrate, as N, at regional storehouse/RER	inorganic chemicals
Calcium borates, at plant/TR U	inorganic chemicals

Commodity	Group
Calcium carbide, technical grade, at plant/RER	inorganic chemicals
Calcium chloride, CaCl2, at plant/RER	inorganic chemicals
Calcium nitrate, as N, at regional storehouse/RER	inorganic chemicals
Carbon dioxide liquid, at plant/RER	inorganic chemicals
Carbon monoxide, CO, at plant/RER	inorganic chemicals
Chlorine dioxide, at plant/RER	inorganic chemicals
Chlorine, gaseous, diaphragm cell, at plant/RER	inorganic chemicals
Chlorine, gaseous, membrane cell, at plant/RER	inorganic chemicals
Chlorine, gaseous, mercury cell, at plant/RER	inorganic chemicals
Chloroacetic acid, at plant/RER	inorganic chemicals
Chromium oxide, flakes, at plant/RER	inorganic chemicals
Copper carbonate, at plant/RER	inorganic chemicals
Copper oxide, at plant/RER	inorganic chemicals
Cryolite, at plant/RER	inorganic chemicals
Deinking emulsion, in paper production, at plant/RER	inorganic chemicals
Diammonium phosphate, as N, at regional storehouse/RER	inorganic chemicals
Diammonium phosphate, as P2O5, at regional storehouse/RER	inorganic chemicals
Explosives, tovex, at plant/CH	inorganic chemicals
Fluorine, liquid, at plant/RER	inorganic chemicals
Fluosilicic acid, 22% in H2O, at plant/RER	inorganic chemicals
Graphite, at plant/RER	inorganic chemicals
Hydrochloric acid, 30% in H2O, at plant/RER	inorganic chemicals
Hydrochloric acid, from Mannheim process, at plant/RER	inorganic chemicals
Hydrochloric acid, from the reaction of hydrogen with chlorine, at plant/RER	inorganic chemicals
Hydrogen cyanide, at plant/RER	inorganic chemicals
Hydrogen fluoride, at plant/GLO	inorganic chemicals
Hydrogen, cracking, at plant/RER	inorganic chemicals
Hydrogen, liquid, diaphragm cell, at plant/RER	inorganic chemicals
Hydrogen, liquid, membrane cell, at plant/RER	inorganic chemicals
Hydrogen, liquid, mercury cell, at plant/RER	inorganic chemicals
Intral, at plant/RER	inorganic chemicals
Iron (III) chloride, 40% in H2O, at plant/CH	inorganic chemicals
Iron sulphate, at plant/RER	inorganic chemicals
Kaolin, at plant/RER	inorganic chemicals
Krypton, gaseous, at plant/RER	inorganic chemicals
Lime, algae, at regional storehouse/CH	inorganic chemicals

Commodity	Group
Lime, from carbonation, at regional storehouse/CH	inorganic chemicals
Lime, hydrated, packed, at plant/CH	inorganic chemicals
Lime, hydraulic, at plant/CH	inorganic chemicals
Limestone, milled, loose, at plant/CH	inorganic chemicals
Magnesium oxide, at plant/RER	inorganic chemicals
Magnesium sulphate, at plant/RER	inorganic chemicals
Malusil, at plant/RER	inorganic chemicals
Monoammonium phosphate, as N, at regional storehouse/RER	inorganic chemicals
Monoammonium phosphate, as P2O5, at regional storehouse/RER	inorganic chemicals
Nitric acid, 50% in H2O, at plant/RER	inorganic chemicals
Nitrogen, liquid, at plant/RER	inorganic chemicals
Oxygen, liquid, at plant/RER	inorganic chemicals
Ozone, liquid, at plant/RER	inorganic chemicals
Phosphoric acid, fertiliser grade, 70% in H2O, at plant/GLO	inorganic chemicals
Phosphoric acid, industrial grade, 85% in H2O, at plant/RER	inorganic chemicals
Phosphorous chloride, at plant/RER	inorganic chemicals
Phosphorus, white, liquid, at plant/RER	inorganic chemicals
Portachrom, at plant/RER	inorganic chemicals
Portafer, at plant/RER	inorganic chemicals
Potassium chloride, as K2O, at regional storehouse/RER	inorganic chemicals
Potassium nitrate, as K2O, at regional storehouse/RER	inorganic chemicals
Potassium nitrate, as N, at regional storehouse/RER	inorganic chemicals
Potassium sulphate, as K2O, at regional storehouse/RER	inorganic chemicals
Purified terephthalic acid, at plant/RER	inorganic chemicals
Secondary sulphur, at refinery/RER	inorganic chemicals
Selenium, at plant/RER	inorganic chemicals
Silicon carbide, at plant/RER	inorganic chemicals
Silicon tetrachloride, at plant/DE	inorganic chemicals
Silicone product, at plant/RER	inorganic chemicals
Single superphosphate, as P2O5, at regional storehouse/RER	inorganic chemicals
Soda, powder, at plant/RER	inorganic chemicals
Sodium borates, at plant/US	inorganic chemicals
Sodium chlorate, powder, at plant/RER	inorganic chemicals
Sodium chloride, brine solution, at plant/RER	inorganic chemicals
Sodium chloride, powder, at plant/RER	inorganic chemicals
Sodium cyanide, at plant/RER	inorganic chemicals

Commodity	Group
Sodium dichromate, at plant/RER	inorganic chemicals
Sodium dithionite, anhydrous, at plant/RER	inorganic chemicals
Sodium hydroxide, 50% in H2O, diaphragm cell, at plant/RER	inorganic chemicals
Sodium hydroxide, 50% in H2O, membrane cell, at plant/RER	inorganic chemicals
Sodium hydroxide, 50% in H2O, mercury cell, at plant/RER	inorganic chemicals
Sodium hypochlorite, 15% in H2O, at plant/RER	inorganic chemicals
Sodium metasilicate pentahydrate, 58%, powder, at plant/RER	inorganic chemicals
Sodium phosphate, at plant/RER	inorganic chemicals
Sodium silicate, furnace liquor, 37% in H2O, at plant/RER	inorganic chemicals
Sodium silicate, furnace process, pieces, at plant/RER	inorganic chemicals
Sodium silicate, hydrothermal liquor, 48% in H2O, at plant/RER	inorganic chemicals
Sodium silicate, spray powder 80%, at plant/RER	inorganic chemicals
Sodium sulphate, from Mannheim process, at plant/RER	inorganic chemicals
Sodium sulphate, from natural sources, at plant/RER	inorganic chemicals
Sodium tripolyphosphate, at plant/RER	inorganic chemicals
Stone meal, at regional storehouse/CH	inorganic chemicals
Sulphite, at plant/RER	inorganic chemicals
Sulphur dioxide, liquid, at plant/RER	inorganic chemicals
Sulphur hexafluoride, liquid, at plant/RER	inorganic chemicals
Sulphur trioxide, at plant/RER	inorganic chemicals
Sulphuric acid, liquid, at plant/RER	inorganic chemicals
Thomas meal, as P2O5, at regional storehouse/RER	inorganic chemicals
Triple superphosphate, as P2O5, at regional storehouse/RER	inorganic chemicals
Urea ammonium nitrate, as N, at regional storehouse/RER	inorganic chemicals
Urea, as N, at regional storehouse/RER	inorganic chemicals
Xenon, gaseous, at plant/RER	inorganic chemicals
Aluminium alloy, AlMg3, at plant/RER	metals
Aluminium, primary, at plant/RER	metals
Aluminium, primary, liquid, at plant/RER	metals
Aluminium, secondary, from new scrap, at plant/RER	metals
Aluminium, secondary, from old scrap, at plant/RER	metals
Brass, at plant/CH	metals
Brazing solder, cadmium free, at plant/RER	metals
Bronze, at plant/CH	metals
Cast iron, at plant/RER	metals
Chromium steel 18/8, at plant/RER	metals

Commodity	Group
Chromium, at regional storage/RER	metals
Cobalt, at plant/GLO	metals
Copper, blister-copper, at primary smelter/RER	metals
Copper, from imported concentrates, at refinery/DE	metals
Copper, primary, at refinery/GLO	metals
Copper, secondary, at refinery/RER	metals
Copper, SX-EW, at refinery/GLO	metals
CZ-monocrystalline-silicon, at plant/RER	metals
Ferrochromium, high-carbon, 68% Cr, at plant/GLO	metals
Ferromanganese, high-coal, 74.5% Mn, at regional storage/RER	metals
Ferronickel, 25% Ni, at plant/GLO	metals
Lead, at regional storage/RER	metals
Magnesium, at plant/RER	metals
Magnesium-alloy, AZ91, at plant/RER	metals
Manganese, at regional storage/RER	metals
Mercury, liquid, at plant/GLO	metals
MG-silicon, at plant/NO	metals
Nickel, 99.5%, at plant/GLO	metals
Palladium, primary, at refinery/ZA	metals
Palladium, secondary, at refinery/RER	metals
Pellets, iron, at plant/GLO	metals
Pig iron, at plant/GLO	metals
Platinum, primary, at refinery/ZA	metals
Platinum, secondary, at refinery/RER	metals
Reinforcing steel, at plant/RER	metals
Rhodium, primary, at refinery/ZA	metals
Rhodium, secondary, at refinery/RER	metals
Silicon, electronic grade, at plant/DE	metals
Silicon, electronic grade, off-grade, at plant/DE	metals
Silicon, pc, casted, at plant/RER	metals
Silicon, solar grade-pc, at plant/RER	metals
Sinter, iron, at plant/GLO	metals
Soft solder, Sn97Cu3, at plant/RER	metals
Steel, converter, chromium steel 18/8, at plant/RER	metals
Steel, converter, low-alloyed, at plant/RER	metals
Steel, converter, unalloyed, at plant/RER	metals

Commodity	Group
Steel, electric, chromium steel 18/8, at plant/RER	metals
Steel, electric, un- and low-alloyed, at plant/RER	metals
Steel, low-alloyed, at plant/RER	metals
Tin, at regional storage/RER	metals
Zinc for coating, at regional storage/RER	metals
[sulfonyl]urea-compounds, at regional storehouse/RER	organic chemicals
[thio]carbamate-compounds, at regional storehouse/RER	organic chemicals
2,4-D, at regional storehouse/RER	organic chemicals
Acetaldehyde, at plant/RER	organic chemicals
Acetamide-anillide-compounds, at regional storehouse/RER	organic chemicals
Acetic anhydride, at plant/RER	organic chemicals
Acetone cyanohydrin, at plant/RER	organic chemicals
Acetone, liquid, at plant/RER	organic chemicals
Acetylene, at regional storehouse/CH	organic chemicals
Acrylonitrile, at plant/RER	organic chemicals
AKD sizer, in paper production, at plant/RER	organic chemicals
Alachlor, at regional storehouse/RER	organic chemicals
Alkyd resin, long oil, 70% in white spirit, at plant/RER	organic chemicals
Alkylbenzene sulfonate, linear, petrochemical, at plant/RER	organic chemicals
Alkylbenzene, linear, at plant/RER	organic chemicals
Allylic chloride, at plant/RER	organic chemicals
Ammonium carbonate, at plant/RER	organic chemicals
Aniline, at plant/RER	organic chemicals
Anionic resin, at plant/CH	organic chemicals
Atrazine, at regional storehouse/RER	organic chemicals
Benzene, at coke plant/GLO	organic chemicals
Benzene, at plant/RER	organic chemicals
Benzimidazole-compounds, at regional storehouse/RER	organic chemicals
Benzo[thia]diazole-compounds, at regional storehouse/RER	organic chemicals
Benzoic-compounds, at regional storehouse/RER	organic chemicals
Bipyridylium-compounds, at regional storehouse/RER	organic chemicals
Bisphenol A, powder, at plant/RER	organic chemicals
Butadiene, at plant/RER	organic chemicals
Butanol, 1-, at plant/RER	organic chemicals
Butene, mixed, at plant/RER	organic chemicals
Butyl acrylate, at plant/RER	organic chemicals

Commodity	Group
Carbofuran, at regional storehouse/RER	organic chemicals
Carbon black, at plant/GLO	organic chemicals
Cationic resin, at plant/CH	organic chemicals
Charcoal, at plant/GLO	organic chemicals
Chlorodifluoromethane, at plant/NL	organic chemicals
Chloromethyl methyl ether, at plant/RER	organic chemicals
Compost, at plant/CH	organic chemicals
Cumene, at plant/RER	organic chemicals
Cyanazine, at regional storehouse/RER	organic chemicals
Cyclic N-compounds, at regional storehouse/RER	organic chemicals
Cyclohexanol, at plant/RER	organic chemicals
Dicamba, at regional storehouse/RER	organic chemicals
Diethanolamine, at plant/RER	organic chemicals
Diethylene glycol, at plant/RER	organic chemicals
Dimethyl ether, at plant/RER	organic chemicals
Dimethyl sulphate, at plant/RER	organic chemicals
Dinitroaniline-compounds, at regional storehouse/RER	organic chemicals
Diphenylether-compounds, at regional storehouse/RER	organic chemicals
Dithiocarbamate-compounds, at regional storehouse/RER	organic chemicals
Diuron, at regional storehouse/RER	organic chemicals
DTPA, diethylenetriaminepentaacetic acid, at plant/RER	organic chemicals
EDTA, ethylenediaminetetraacetic acid, at plant/RER	organic chemicals
Epichlorhydrin, at plant/RER	organic chemicals
Epoxy resin insulator (Al2O3), at plant/RER	organic chemicals
Epoxy resin insulator (SiO2), at plant/RER	organic chemicals
Epoxy resin, liquid, at plant/RER	organic chemicals
Esterquat, coconut oil and palm kernel oil, at plant/RER	organic chemicals
Esterquat, tallow, at plant/RER	organic chemicals
Ethoxylated alcohols (AE11), palm oil, at plant/RER	organic chemicals
Ethoxylated alcohols (AE3), coconut oil, at plant/RER	organic chemicals
Ethoxylated alcohols (AE3), palm kernel oil, at plant/RER	organic chemicals
Ethoxylated alcohols (AE3), petrochemical, at plant/RER	organic chemicals
Ethoxylated alcohols (AE7), coconut oil, at plant/RER	organic chemicals
Ethoxylated alcohols (AE7), palm kernel oil, at plant/RER	organic chemicals
Ethoxylated alcohols (AE7), petrochemical, at plant/RER	organic chemicals
Ethyl benzene, at plant/RER	organic chemicals

Commodity	Group
Ethylene dichloride, at plant/RER	organic chemicals
Ethylene glycol, at plant/RER	organic chemicals
Ethylene oxide, at plant/RER	organic chemicals
Ethylene, average, at plant/RER	organic chemicals
Ethylene, pipeline system, at plant/RER	organic chemicals
Ethylenediamine, at plant/RER	organic chemicals
Fatty acids, from vegetarian oil, at plant/RER	organic chemicals
Fatty alcohol sulfonate, coconut oil, at plant/RER	organic chemicals
Fatty alcohol sulfonate, palm oil, at plant/RER	organic chemicals
Fatty alcohol sulfonate, palm kernel oil, at plant/RER	organic chemicals
Fatty alcohol sulfonate, petrochemical, at plant/RER	organic chemicals
Fatty alcohol, from coconut oil, at plant/RER	organic chemicals
Fatty alcohol, from palm kernel oil, at plant/RER	organic chemicals
Fatty alcohol, from palm oil, at plant/RER	organic chemicals
Fatty alcohol, petrochemical, at plant/RER	organic chemicals
Formaldehyde, production mix, at plant/RER	organic chemicals
Glyphosate, at regional storehouse/RER	organic chemicals
Horn meal, at regional storehouse/CH	organic chemicals
Isopropanol, at plant/RER	organic chemicals
Linuron, at regional storehouse/RER	organic chemicals
Lubricating oil, at plant/RER	organic chemicals
Maleic anhydride from catalytic oxidation of benzene, at plant/RER	organic chemicals
Maleic anhydride from the direct oxidation of n-butane, at plant/RER	organic chemicals
Maneb, at regional storehouse/RER	organic chemicals
MCPA, at regional storehouse/RER	organic chemicals
Melamine formaldehyde resin, at plant/RER	organic chemicals
Melamine, at plant/RER	organic chemicals
Methanol, at plant/GLO	organic chemicals
Methyl ethyl ketone, at plant/RER	organic chemicals
Methyl methacrylate, at plant/RER	organic chemicals
Methyl tert-butyl ether, at plant/RER	organic chemicals
Methylene diphenyl diisocyanate, at plant/RER	organic chemicals
Metolachlor, at regional storehouse/RER	organic chemicals
Monoethanolamine, at plant/RER	organic chemicals
Nitrile-compounds, at regional storehouse/RER	organic chemicals
Nitrobenzene, at plant/RER	organic chemicals

Commodity	Group
Nitro-compounds, at regional storehouse/RER	organic chemicals
N-olefins, at plant/RER	organic chemicals
Organophosphorus-compounds, at regional storehouse/RER	organic chemicals
Paraffin, at plant/RER	organic chemicals
Parathion, at regional storehouse/RER	organic chemicals
Penta-erythritol, at plant/RER	organic chemicals
Pentane, at plant/RER	organic chemicals
Phenol, at plant/RER	organic chemicals
Phenolic resin, at plant/RER	organic chemicals
Phenoxy-compounds, at regional storehouse/RER	organic chemicals
Phosgene, liquid, at plant/RER	organic chemicals
Phtalamide-compounds, at regional storehouse/RER	organic chemicals
Phthalic anhydride, at plant/RER	organic chemicals
Polyester resin, unsaturated, at plant/RER	organic chemicals
Polyols, at plant/RER	organic chemicals
Poultry manure, dried, at regional storehouse/CH	organic chemicals
Printing colour, offset, 47.5% solvent, at plant/RER	organic chemicals
Printing colour, rotogravure, 55% toluene, at plant/RER	organic chemicals
Propachlor, at regional storehouse/RER	organic chemicals
Propylene glycol, liquid, at plant/RER	organic chemicals
Propylene oxide, liquid, at plant/RER	organic chemicals
Propylene, at plant/RER	organic chemicals
Pyretroid-compounds, at regional storehouse/RER	organic chemicals
Pyridazine-compounds, at regional storehouse/RER	organic chemicals
Resin size, at plant/RER	organic chemicals
Retention aids, in paper production, at plant/RER	organic chemicals
Rosin size, in paper production, at plant/RER	organic chemicals
Soap, at plant/RER	organic chemicals
Sodium formate, reaction of formaldehyde with acetaldehyde, at plant/RER	organic chemicals
Styrene, at plant/RER	organic chemicals
Tar, at coke plant/GLO	organic chemicals
Toluene, liquid, at plant/RER	organic chemicals
Triazine-compounds, at regional storehouse/RER	organic chemicals
Trichloromethane, at plant/RER	organic chemicals
Triethanolamine, at plant/RER	organic chemicals
Triethylene glycol, at plant/RER	organic chemicals

Commodity	Group
Trimethylamine, at plant/RER	organic chemicals
Urea formaldehyde resin, at plant/RER	organic chemicals
Vinasse, at regional storehouse/CH	organic chemicals
Vinyl acetate, at plant/RER	organic chemicals
Vinyl chloride, at plant/RER	organic chemicals
White spirit, at plant/RER	organic chemicals
Xylene, at plant/RER	organic chemicals
Chemi-thermomechanical pulp, at plant/RER	paper+board
Core board, at plant/RER	paper+board
Corrugated board base paper, kraftliner, at plant/RER	paper+board
Corrugated board base paper, semichemical fluting, at plant/RER	paper+board
Corrugated board base paper, testliner, at plant/RER	paper+board
Corrugated board base paper, wellenstoff, at plant/RER	paper+board
Corrugated board, fresh fibre, single wall, at plant/RER	paper+board
Corrugated board, mixed fibre, single wall, at plant/RER	paper+board
Corrugated board, recycling fibre, double wall, at plant/RER	paper+board
Corrugated board, recycling fibre, single wall, at plant/RER	paper+board
Kraft paper, bleached, at plant/RER	paper+board
Kraft paper, unbleached, at plant/RER	paper+board
Liquid packaging board, at plant/RER	paper+board
Packaging, corrugated board, mixed fibre, single wall, at plant/RER	paper+board
Paper, newsprint, 0% DIP, at plant/RER	paper+board
Paper, newsprint, DIP containing, at plant/RER	paper+board
Paper, recycling, no deinking, at plant/RER	paper+board
Paper, recycling, with deinking, at plant/RER	paper+board
Paper, woodcontaining, supercalendred (SC), at plant/RER	paper+board
Paper, woodfree, coated, at non-integrated mill/RER	paper+board
Paper, woodfree, uncoated, at integrated mill/RER	paper+board
Paper, woodfree, uncoated, at non-integrated mill/RER	paper+board
Production of liquid packaging board containers, at plant/RER	paper+board
Stone groundwood pulp, SGW, at plant/RER	paper+board
Sulphate pulp, ECF bleached, at plant/RER	paper+board
Sulphate pulp, TCF bleached, at plant/RER	paper+board
Sulphate pulp, unbleached, at plant/RER	paper+board
Sulphite pulp, bleached, at plant/RER	paper+board
Thermo-mechanical pulp, at plant/RER	paper+board

Commodity	Group
Bitumen sealing, at plant/RER	plastics
Ethylene vinyl acetate copolymer, at plant/RER	plastics
Ethylvinylacetate, foil, at plant/RER	plastics
Fleece, polyethylene, at plant/RER	plastics
Glass fibre reinforced plastic, polyamide, injection moulding, at plant/RER	plastics
Glass fibre reinforced plastic, polyester resin, hand lay-up, at plant/RER	plastics
Nylon 6, at plant/RER	plastics
Nylon 6, glass-filled, at plant/RER	plastics
Nylon 66, at plant/RER	plastics
Nylon 66, glass-filled, at plant/RER	plastics
Packaging film, LDPE, at plant/RER	plastics
Polybutadiene, at plant/RER	plastics
Polycarbonate, at plant/RER	plastics
Polyethylene terephthalate, granulate, amorphous, at plant/RER	plastics
Polyethylene terephthalate, granulate, bottle grade, at plant/RER	plastics
Polyethylene, HDPE, granulate, at plant/RER	plastics
Polyethylene, LDPE, granulate, at plant/RER	plastics
Polyethylene, LLDPE, granulate, at plant/RER	plastics
Polymethyl methacrylate, beads, at plant/RER	plastics
Polymethyl methacrylate, sheet, at plant/RER	plastics
Polypropylene, granulate, at plant/RER	plastics
Polystyrene, expandable, at plant/RER	plastics
Polystyrene, general purpose, GPPS, at plant/RER	plastics
Polystyrene, high impact, HIPS, at plant/RER	plastics
Polyurethane, rigid foam, at plant/RER	plastics
Polyvinylchloride, bulk polymerised, at plant/RER	plastics
Polyvinylchloride, emulsion polymerised, at plant/RER	plastics
Polyvinylchloride, suspension polymerised, at plant/RER	plastics
Polyvinylidenchloride, granulate, at plant/RER	plastics
Styrene-acrylonitrile copolymer, SAN, at plant/RER	plastics
Synthetic rubber, at plant/RER	plastics
Tetrafluoroethylene film, on glass/RER	plastics
Tetrafluoroethylene, at plant/RER	plastics

Table S3: Environmental interventions and related impact factors used in the cumulative energy demand methodology

Name	Category	Unit	Impact factor
Coal, brown, in ground	Resource	MJ-eq/kg	9.9
Coal, hard, in ground	Resource	MJ-eq/kg	19.1
Energy, gross calorific value, in biomass	Resource	MJ-eq/MJ	1
Energy, kinetic, flow, in wind	Resource	MJ-eq/MJ	1
Energy, potential, stock, in barrage water	Resource	MJ-eq/MJ	1
Energy, solar	Resource	MJ-eq/MJ	1
Gas, mine, off-gas, process, coal mining	Resource	MJ-eq/Nm3	39.8
Gas, natural, in ground	Resource	MJ-eq/Nm3	38.3
Uranium, in ground	Resource	MJ-eq/kg	560,000
Oil, crude, in ground	Resource	MJ-eq/kg	45.8
Peat, in ground	Resource	MJ-eq/kg	9.9

Table S4: Environmental interventions and related impact factors used in the ecological footprint methodology

Name	Category	Unit	Impact factor
Carbon dioxide, fossil	Air	m^2-eq.yr/kg	2.672
Uranium, in ground	Resource	m^2-eq.yr/kg	109737.6
Occupation, arable, non-irrigated	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, construction site	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, dump site	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, dump site, benthos	Land	m^2-eq.yr/m^2.yr	0.36
Occupation, forest, intensive	Land	m^2-eq.yr/m^2.yr	1.38
Occupation, forest, intensive, normal	Land	m^2-eq.yr/m^2.yr	1.38
Occupation, industrial area	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, industrial area, benthos	Land	m^2-eq.yr/m^2.yr	0.36
Occupation, industrial area, built up	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, industrial area, vegetation	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, mineral extraction site	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, pasture and meadow, extensive	Land	m^2-eq.yr/m^2.yr	0.48
Occupation, pasture and meadow, intensive	Land	m^2-eq.yr/m^2.yr	0.48
Occupation, permanent crop, fruit, intensive	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, shrub land, sclerophyllous	Land	m^2-eq.yr/m^2.yr	1.38
Occupation, traffic area, rail embankment	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, traffic area, rail network	Land	m^2-eq.yr/m^2.yr	2.19

Occupation, traffic area, road embankment	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, traffic area, road network	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, urban, discontinuously built	Land	m^2-eq.yr/m^2.yr	2.19
Occupation, water bodies, artificial	Land	m^2-eq.yr/m^2.yr	1
Occupation, water courses, artificial	Land	m^2-eq.yr/m^2.yr	1

Table S5: Environmental interventions and related impact factors used in the Cumulative Exergy Extraction from the Natural Environment (CEENE) methodology

Name	Category	Unit	Impact factor
Aluminium, 24% in bauxite, 11% in crude ore, in ground	Resource	MJ_{ex} / kg	0.47
Anhydrite, in ground	Resource	MJ_{ex} / kg	0.158
Barite, 15% in crude ore, in ground	Resource	MJ_{ex} / kg	0.128
Basalt, in ground	Resource	MJ_{ex} / kg	0.31
Borax, in ground	Resource	MJ_{ex} / kg	0.235
Calcite, in ground	Resource	MJ_{ex} / kg	0.184
Chromium, 25.5 in chromite, 11.6% in crude ore, in ground	Resource	MJ_{ex} / kg	1.6
Chrysotile, in ground	Resource	MJ_{ex} / kg	0.106
Cinnabar, in ground	Resource	MJ_{ex} / kg	2.88
Clay, bentonite, in ground	Resource	MJ_{ex} / kg	0.109
Clay, unspecified, in ground	Resource	MJ_{ex} / kg	0.106
Coal, brown, in ground	Resource	MJ_{ex} / kg	10.3
Coal, hard, unspecified, in ground	Resource	MJ_{ex} / kg	19.7
Cobalt, in ground	Resource	MJ_{ex} / kg	1.18
Colemanite, in ground	Resource	MJ_{ex} / kg	0.269
Copper, 0.52% in sulfide, Cu 0.27% and Mo 8.2E-3% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 0.59% in sulfide, Cu 0.22% and Mo 8.2E-3% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 0.97% in sulfide, Cu 0.36% and Mo 4.1E-2% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 0.99% in sulfide, Cu 0.36% and Mo 8.2E-3% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 1.13% in sulfide, Cu 0.76% and Ni 0.76% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 1.18% in sulfide, Cu 0.39% and Mo 8.2E-3% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 1.42% in sulfide, Cu 0.81% and Mo 8.2E-3% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Copper, 2.19% in sulfide, Cu 1.83% and Mo 8.2E-3% in crude ore, in ground	Resource	MJ_{ex} / kg	15.8
Cu, Cu 3.2E+0%, Pt 2.5E-4%, Pd 7.3E-4%, Rh 2.0E-5%, Ni 2.3E+0% in ore, in ground	Resource	MJ_{ex} / kg	15.8

Name	Category	Unit	Impact factor
Cu, Cu 5.2E-2%, Pt 4.8E-4%, Pd 2.0E-4%, Rh 2.4E-5%, Ni 3.7E-2% in ore, in ground	Resource	MJ_{ex} / kg	15.8
Diatomite, in ground	Resource	MJ_{ex} / kg	4.05
Dolomite, in ground	Resource	MJ_{ex} / kg	0.126
Energy, kinetic, flow, in wind	Resource	MJ_{ex} / MJ	4
Energy, potential, stock, in barrage water	Resource	MJ_{ex} / MJ	1.253
Feldspar, in ground	Resource	MJ_{ex} / kg	0.103
Fluorine, 4.5% in apatite, 1% in crude ore, in ground	Resource	MJ_{ex} / kg	0.026
Fluorine, 4.5% in apatite, 3% in crude ore, in ground	Resource	MJ_{ex} / kg	0.026
Fluorspar, 92%, in ground	Resource	MJ_{ex} / kg	0.44
Gas, natural, in ground	Resource	MJ_{ex} / Nm^3	38.28
Granite, in ground	Resource	MJ_{ex} / kg	0.0904
Gravel, in ground	Resource	MJ_{ex} / kg	0.0904
Gypsum, in ground	Resource	MJ_{ex} / kg	0.15
Iron, 46% in ore, 25% in crude ore, in ground	Resource	MJ_{ex} / kg	0.362
Kaolinite, 24% in crude ore, in ground	Resource	MJ_{ex} / kg	0.057
Kieserite, 25% in crude ore, in ground	Resource	MJ_{ex} / kg	0.272
Lead, 5%, in sulfide, Pb 2.97% and Zn 5.34% in crude ore, in ground	Resource	MJ_{ex} / kg	3.58
Magnesite, 60% in crude ore, in ground	Resource	MJ_{ex} / kg	0.115
Manganese, 35.7% in sedimentary deposit, 14.2% in crude ore, in ground	Resource	MJ_{ex} / kg	1.01
Metamorphous rock, graphite containing, in ground	Resource	MJ_{ex} / kg	34.2
Molybdenum, 0.010% in sulfide, Mo 8.2E-3% and Cu 1.83% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Molybdenum, 0.014% in sulfide, Mo 8.2E-3% and Cu 0.81% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Molybdenum, 0.016% in sulfide, Mo 8.2E-3% and Cu 0.27% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Molybdenum, 0.022% in sulfide, Mo 8.2E-3% and Cu 0.22% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Molybdenum, 0.022% in sulfide, Mo 8.2E-3% and Cu 0.36% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Molybdenum, 0.025% in sulfide, Mo 8.2E-3% and Cu 0.39% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5

Name	Category	Unit	Impact factor
Molybdenum, 0.11% in sulfide, Mo 0.41% and Cu 0.36% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Molybdenum, 0.11% in sulfide, Mo 4.1E-2% and Cu 0.36% in crude ore, in ground	Resource	MJ_{ex} / kg	17.5
Ni, Ni 2.3E+0%, Pt 2.5E-4%, Pd 7.3E-4%, Rh 2.0E-5%, Cu 3.2E+0% in ore, in ground	Resource	MJ_{ex} / kg	25.1
Ni, Ni 3.7E-2%, Pt 4.8E-4%, Pd 2.0E-4%, Rh 2.4E-5%, Cu 5.2E-2% in ore, in ground	Resource	MJ_{ex} / kg	25.1
Nickel, 1.13% in sulfide, Ni 0.76% and Cu 0.76% in crude ore, in ground	Resource	MJ_{ex} / kg	25.1
Nickel, 1.13% in sulfides, 0.76% in crude ore, in ground	Resource	MJ_{ex} / kg	3.85
Oil, crude, in ground	Resource	MJ_{ex} / kg	46.2
Olivine, in ground	Resource	MJ_{ex} / kg	0.479
Pd, Pd 2.0E-4%, Pt 4.8E-4%, Rh 2.4E-5%, Ni 3.7E-2%, Cu 5.2E-2% in ore, in ground	Resource	MJ_{ex} / kg	6.48
Pd, Pd 7.3E-4%, Pt 2.5E-4%, Rh 2.0E-5%, Ni 2.3E+0%, Cu 3.2E+0% in ore, in ground	Resource	MJ_{ex} / kg	6.48
Peat, in ground	Resource	MJ_{ex} / kg	10.21
Perlite, in ground	Resource	MJ_{ex} / kg	0.063
Phosphorus, 18% in apatite, 12% in crude ore, in ground	Resource	MJ_{ex} / kg	0.026
Phosphorus, 18% in apatite, 4% in crude ore, in ground	Resource	MJ_{ex} / kg	0.026
Pt, Pt 2.5E-4%, Pd 7.3E-4%, Rh 2.0E-5%, Ni 2.3E+0%, Cu 3.2E+0% in ore, in ground	Resource	MJ_{ex} / kg	4.1
Pt, Pt 4.8E-4%, Pd 2.0E-4%, Rh 2.4E-5%, Ni 3.7E-2%, Cu 5.2E-2% in ore, in ground	Resource	MJ_{ex} / kg	4.1
Pumice, in ground	Resource	MJ_{ex} / kg	0.073
Pyrite, in ground	Resource	MJ_{ex} / kg	11.9
Rh, Rh 2.0E-5%, Pt 2.5E-4%, Pd 7.3E-4%, Ni 2.3E+0%, Cu 3.2E+0% in ore, in ground	Resource	MJ_{ex} / kg	9.26
Rh, Rh 2.4E-5%, Pt 4.8E-4%, Pd 2.0E-4%, Ni 3.7E-2%, Cu 5.2E-2% in ore, in ground	Resource	MJ_{ex} / kg	9.26
Rhenium, in crude ore, in ground	Resource	MJ_{ex} / kg	8.69
Rutile, in ground	Resource	MJ_{ex} / kg	0.264
Sand, unspecified, in ground	Resource	MJ_{ex} / kg	0.031
Shale, in ground	Resource	MJ_{ex} / kg	0.081

Name	Category	Unit	Impact factor
Silver, 0.01% in crude ore, in ground	Resource	MJ_{ex} / kg	3.28
Sodium chloride, in ground	Resource	MJ_{ex} / kg	0.248
Sodium sulphate, various forms, in ground	Resource	MJ_{ex} / kg	0.127
Spodumene, in ground	Resource	MJ_{ex} / kg	0.213
Stibnite, in ground	Resource	MJ_{ex} / kg	7.34
Sulfur, in ground	Resource	MJ_{ex} / kg	18.94
Sylvite, 25 % in sylvinite, in ground	Resource	MJ_{ex} / kg	0.268
Talc, in ground	Resource	MJ_{ex} / kg	0.057
Tin, 79% in cassiterite, 0.1% in crude ore, in ground	Resource	MJ_{ex} / kg	0.363
TiO2, 45-60% in Ilmenite, in ground	Resource	MJ_{ex} / kg	1.69
Ulexite, in ground	Resource	MJ_{ex} / kg	0.217
Uranium, in ground	Resource	MJ_{ex} / kg	469000
Vermiculite, in ground	Resource	MJ_{ex} / kg	0.11
Zinc 9%, in sulfide, Zn 5.34% and Pb 2.97% in crude ore, in ground	Resource	MJ_{ex} / kg	11.4
Water, cooling, unspecified natural origin/m3	Resource	MJ_{ex} / m^3	50
Water, lake	Resource	MJ_{ex} / m^3	50
Water, river	Resource	MJ_{ex} / m^3	50
Water, unspecified natural origin/m3	Resource	MJ_{ex} / m^3	50
Water, well, in ground	Resource	MJ_{ex} / m^3	50
Occupation, arable, non-irrigated	Land	MJ_{ex} / m^2.yr	68.14
Occupation, construction site	Land	MJ_{ex} / m^2.yr	68.14
Occupation, dump site	Land	MJ_{ex} / m^2.yr	68.14
Occupation, forest, intensive	Land	MJ_{ex} / m^2.yr	68.14
Occupation, forest, intensive, normal	Land	MJ_{ex} / m^2.yr	68.14
Occupation, industrial area	Land	MJ_{ex} / m^2.yr	68.14
Occupation, industrial area, built up	Land	MJ_{ex} / m^2.yr	68.14
Occupation, industrial area, vegetation	Land	MJ_{ex} / m^2.yr	68.14
Occupation, mineral extraction site	Land	MJ_{ex} / m^2.yr	68.14
Occupation, pasture and meadow, intensive	Land	MJ_{ex} / m^2.yr	68.14
Occupation, permanent crop, fruit, intensive	Land	MJ_{ex} / m^2.yr	68.14
Occupation, shrub land, sclerophyllous	Land	MJ_{ex} / m^2.yr	68.14
Occupation, traffic area, rail embankment	Land	MJ_{ex} / m^2.yr	68.14
Occupation, traffic area, rail network	Land	MJ_{ex} / m^2.yr	68.14
Occupation, traffic area, road embankment	Land	MJ_{ex} / m^2.yr	68.14

Name	Category	Unit	Impact factor
Occupation, traffic area, road network	Land	MJ_{ex} / m^2.yr	68.14
Occupation, urban, discontinuously built	Land	MJ_{ex} / m^2.yr	68.14
Occupation, water bodies, artificial	Land	MJ_{ex} / m^2.yr	68.14
Occupation, water courses, artificial	Land	MJ_{ex} / m^2.yr	68.14

Table S6: Environmental interventions and related impact factors used in the Carbon Footprint (CF) methodology

Name	Category	Unit	Impact factor
Carbon dioxide	Air	kg CO_2-Eq/kg	1
Carbon monoxide	Air	kg CO_2-Eq/kg	1.57
Chloroform	Air	kg CO_2-Eq/kg	30
Dinitrogen monoxide	Air	kg CO_2-Eq/kg	296
Ethane, 1,1,1,2-tetrafluoro-, HFC-134a	Air	kg CO_2-Eq/kg	1300
Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114	Air	kg CO_2-Eq/kg	9800
Ethane, hexafluoro-, HFC-116	Air	kg CO_2-Eq/kg	11900
Methane	Air	kg CO_2-Eq/kg	23
Methane, bromochlorodifluoro-, Halon 1211	Air	kg CO_2-Eq/kg	1300
Methane, bromotrifluoro-, Halon 1301	Air	kg CO_2-Eq/kg	6900
Methane, chlorodifluoro-, HCFC-22	Air	kg CO_2-Eq/kg	1700
Methane, dichloro-, HCC-30	Air	kg CO_2-Eq/kg	10
Methane, dichlorodifluoro-, CFC-12	Air	kg CO_2-Eq/kg	10600
Methane, dichlorofluoro-, HCFC-21	Air	kg CO_2-Eq/kg	210
Methane, monochloro-, R-40	Air	kg CO_2-Eq/kg	16
Methane, tetrachloro-, CFC-10	Air	kg CO_2-Eq/kg	1800
Methane, tetrafluoro-, FC-14	Air	kg CO_2-Eq/kg	5700
Methane, trichlorofluoro-, CFC-11	Air	kg CO_2-Eq/kg	4600
Methane, trifluoro-, HFC-23	Air	kg CO_2-Eq/kg	12000
Sulfur hexafluoride	Air	kg CO_2-Eq/kg	22200

Table S7: Environmental interventions and related impact factors used in the Environmental Priority Strategy (EPS) methodology

Name	Category	Unit	Impact factor
Acetaldehyde	Air	Pt/kg	2.11
Acetone	Air	Pt/kg	1.46
Acrolein	Air	Pt/kg	3.32
Ammonia	Air	Pt/kg	2.90
Ammonium carbonate	Air	Pt/kg	0.01
Arsenic	Air	Pt/kg	95.28
Benzene	Air	Pt/kg	3.65
Benzene, ethyl-	Air	Pt/kg	2.11
Benzo(a)pyrene	Air	Pt/kg	64280
Butadiene	Air	Pt/kg	10.73
Butane	Air	Pt/kg	2.15
Butene	Air	Pt/kg	2.58
Cadmium	Air	Pt/kg	10.17
Carbon dioxide	Air	Pt/kg	0.11
Carbon monoxide	Air	Pt/kg	0.33
Chromium	Air	Pt/kg	20.05
Cumene	Air	Pt/kg	2.07
Dinitrogen monoxide	Air	Pt/kg	38.30
Ethane	Air	Pt/kg	1.46
Ethane, 1,1,1,2-tetrafluoro-, HFC-134a	Air	Pt/kg	143.76
Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114	Air	Pt/kg	1107.79
Ethane, hexafluoro-, HFC-116	Air	Pt/kg	1383.47
Ethanol	Air	Pt/kg	1.95
Ethene	Air	Pt/kg	3.54
Ethyne	Air	Pt/kg	1.64
Formaldehyde	Air	Pt/kg	6.26
Heptane	Air	Pt/kg	2.58
Hexane	Air	Pt/kg	2.56
Hydrogen chloride	Air	Pt/kg	2.13
Hydrogen fluoride	Air	Pt/kg	2.07
Hydrogen sulfide	Air	Pt/kg	6.89
Lead	Air	Pt/kg	2910
m-Xylene	Air	Pt/kg	2.20
Mercury	Air	Pt/kg	61.42

Name	Category	Unit	Impact factor
Methane	Air	Pt/kg	2.72
Methane, bromotrifluoro-, Halon 1301	Air	Pt/kg	2199.54
Methane, chlorodifluoro-, HCFC-22	Air	Pt/kg	193.82
Methane, dichlorodifluoro-, CFC-12	Air	Pt/kg	1039.84
Methane, tetrafluoro-, FC-14	Air	Pt/kg	697.46
Methane, trichlorofluoro-, CFC-11	Air	Pt/kg	541.36
Methane, trifluoro-, HFC-23	Air	Pt/kg	1339.83
Methanol	Air	Pt/kg	1.44
Nitrogen oxides	Air	Pt/kg	2.13
PAH, polycyclic aromatic hydrocarbons	Air	Pt/kg	64280
Particulates, < 2.5 um	Air	Pt/kg	67.26
Particulates, > 10 um	Air	Pt/kg	10.55
Particulates, > 2.5 um, and < 10um	Air	Pt/kg	36.06
Pentane	Air	Pt/kg	2.25
Polychlorinated biphenyls	Air	Pt/kg	64280
Propane	Air	Pt/kg	2.24
Propene	Air	Pt/kg	2.64
Sulfur dioxide	Air	Pt/kg	3.27
Sulfur hexafluoride	Air	Pt/kg	2751.70
Toluene	Air	Pt/kg	1.95
BOD5, Biological Oxygen Demand	Freshwater	Pt/kg	0.002
COD, Chemical Oxygen Demand	Freshwater	Pt/kg	0.001
Nitrogen	Freshwater	Pt/kg	-0.38
Atrazine	Agricultural Soil	Pt/kg	0.10
Cypermethrin	Agricultural Soil	Pt/kg	0.36
Glyphosate	Agricultural Soil	Pt/kg	0.04
Aluminium, 24% in bauxite, 11% in crude ore, in ground	Resource	Pt/kg	0.44
Barite, 15% in crude ore, in ground	Resource	Pt/kg	2.62
Borax, in ground	Resource	Pt/kg	0.02
Chromium, 25.5 in chromite, 11.6% in crude ore, in ground	Resource	Pt/kg	84.90
Cinnabar, in ground	Resource	Pt/kg	45700
Coal, brown, in ground	Resource	Pt/kg	0.03
Coal, hard, unspecified, in ground	Resource	Pt/kg	0.05
Cobalt, in ground	Resource	Pt/kg	256
Colemanite, in ground	Resource	Pt/kg	0.01

Name	Category	Unit	Impact factor
Copper, 0.99% in sulfide, Cu 0.36% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	208
Copper, 1.18% in sulfide, Cu 0.39% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	208
Copper, 1.42% in sulfide, Cu 0.81% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	208
Copper, 2.19% in sulfide, Cu 1.83% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	208
Fluorine, 4.5% in apatite, 1% in crude ore, in ground	Resource	Pt/kg	4.86
Fluorine, 4.5% in apatite, 3% in crude ore, in ground	Resource	Pt/kg	4.86
Fluorspar, 92%, in ground	Resource	Pt/kg	2.37
Gas, mine, off-gas, process, coal mining/m3	Resource	Pt/Nm3	0.79
Gas, natural, in ground	Resource	Pt/Nm3	0.79
Gravel, in ground	Resource	Pt/kg	0.002
Iron, 46% in ore, 25% in crude ore, in ground	Resource	Pt/kg	0.96
Kaolinite, 24% in crude ore, in ground	Resource	Pt/kg	0.09
Lead, 5%, in sulfide, Pb 2.97% and Zn 5.34% in crude ore, in ground	Resource	Pt/kg	175
Manganese, 35.7% in sedimentary deposit, 14.2% in crude ore, in ground	Resource	Pt/kg	5.64
Mercury, in ground	Resource	Pt/kg	53000
Molybdenum, 0.010% in sulfide, Mo 8.2E-3% and Cu 1.83% in crude ore, in ground	Resource	Pt/kg	2120
Molybdenum, 0.014% in sulfide, Mo 8.2E-3% and Cu 0.81% in crude ore, in ground	Resource	Pt/kg	2120
Molybdenum, 0.022% in sulfide, Mo 8.2E-3% and Cu 0.36% in crude ore, in ground	Resource	Pt/kg	2120
Molybdenum, 0.025% in sulfide, Mo 8.2E-3% and Cu 0.39% in crude ore, in ground	Resource	Pt/kg	2120
Molybdenum, 0.11% in sulfide, Mo 4.1E-2% and Cu 0.36% in crude ore, in ground	Resource	Pt/kg	2120
Nickel, 1.13% in sulfide, Ni 0.76% and Cu 0.76% in crude ore, in ground	Resource	Pt/kg	160
Nickel, 1.98% in silicates, 1.04% in crude ore, in ground	Resource	Pt/kg	160
Oil, crude, in ground	Resource	Pt/kg	0.51

Name	Category	Unit	Impact factor
Pd, Pd 2.0E-4%, Pt 4.8E-4%, Rh 2.4E-5%, Ni 3.7E-2%, Cu 5.2E-2% in ore, in ground	Resource	Pt/kg	7430000
Pd, Pd 7.3E-4%, Pt 2.5E-4%, Rh 2.0E-5%, Ni 2.3E+0%, Cu 3.2E+0% in ore, in ground	Resource	Pt/kg	7430000
Peat, in ground	Resource	Pt/kg	0.20
Phosphorus, 18% in apatite, 12% in crude ore, in ground	Resource	Pt/kg	4.47
Phosphorus, 18% in apatite, 4% in crude ore, in ground	Resource	Pt/kg	4.47
Pt, Pt 2.5E-4%, Pd 7.3E-4%, Rh 2.0E-5%, Ni 2.3E+0%, Cu 3.2E+0% in ore, in ground	Resource	Pt/kg	7430000
Pt, Pt 4.8E-4%, Pd 2.0E-4%, Rh 2.4E-5%, Ni 3.7E-2%, Cu 5.2E-2% in ore, in ground	Resource	Pt/kg	7430000
Rh, Rh 2.0E-5%, Pt 2.5E-4%, Pd 7.3E-4%, Ni 2.3E+0%, Cu 3.2E+0% in ore, in ground	Resource	Pt/kg	49500000
Rh, Rh 2.4E-5%, Pt 4.8E-4%, Pd 2.0E-4%, Ni 3.7E-2%, Cu 5.2E-2% in ore, in ground	Resource	Pt/kg	49500000
Rhenium, in crude ore, in ground	Resource	Pt/kg	7430000
Rutile, in ground	Resource	Pt/kg	0.57
Silver, 0.01% in crude ore, in ground	Resource	Pt/kg	54000
Stibnite, in ground	Resource	Pt/kg	6870
Sulfur, in ground	Resource	Pt/kg	0.10
Tin, 79% in cassiterite, 0.1% in crude ore, in ground	Resource	Pt/kg	1190
TiO2, 45-60% in Ilmenite, in ground	Resource	Pt/kg	0.57
Ulexite, in ground	Resource	Pt/kg	0.01
Uranium, in ground	Resource	Pt/kg	1190
Zinc 9%, in sulfide, Zn 5.34% and Pb 2.97% in crude ore, in ground	Resource	Pt/kg	57.1
Occupation, arable, non-irrigated	Land	Pt/m2.yr	0.002
Occupation, construction site	Land	Pt/m2.yr	0.046
Occupation, dump site	Land	Pt/m2.yr	0.046
Occupation, forest, intensive	Land	Pt/m2.yr	0.001
Occupation, forest, intensive, normal	Land	Pt/m2.yr	0.001
Occupation, industrial area	Land	Pt/m2.yr	0.046
Occupation, industrial area, built up	Land	Pt/m2.yr	0.046
Occupation, industrial area, vegetation	Land	Pt/m2.yr	0.046
Occupation, mineral extraction site	Land	Pt/m2.yr	0.046

Name	Category	Unit	Impact factor
Occupation, permanent crop, fruit, intensive	Land	Pt/m2.yr	0.002
Occupation, shrub land, sclerophyllous	Land	Pt/m2.yr	0.001
Occupation, traffic area, rail embankment	Land	Pt/m2.yr	0.046
Occupation, traffic area, rail network	Land	Pt/m2.yr	0.046
Occupation, traffic area, road embankment	Land	Pt/m2.yr	0.046
Occupation, traffic area, road network	Land	Pt/m2.yr	0.046
Occupation, urban, discontinuously built	Land	Pt/m2.yr	0.046

Table S8: Environmental interventions and related impact factors used in the EcoScarcity methodology (ES)

Name	Category	Unit	Impact factor
Acetaldehyde	Air	Pt/kg	32000
Acetic acid	Air	Pt/kg	32000
Acetone	Air	Pt/kg	32000
Acrolein	Air	Pt/kg	32000
Aldehydes, unspecified	Air	Pt/kg	32000
Ammonia	Air	Pt/kg	63000
Benzaldehyde	Air	Pt/kg	32000
Benzene	Air	Pt/kg	32000
Benzene, ethyl-	Air	Pt/kg	32000
Benzene, hexachloro-	Air	Pt/kg	32000
Benzene, pentachloro-	Air	Pt/kg	32000
Benzo(a)pyrene	Air	Pt/kg	32000
Butadiene	Air	Pt/kg	32000
Butane	Air	Pt/kg	32000
Butene	Air	Pt/kg	32000
Cadmium	Air	Pt/kg	120000000
Carbon dioxide, fossil	Air	Pt/kg	200
Carbon monoxide, fossil	Air	Pt/kg	1000
Chloroform	Air	Pt/kg	32000
Cumene	Air	Pt/kg	32000
Dinitrogen monoxide	Air	Pt/kg	62000
Dioxins, measured as 2,3,7,8-tetrachlorodibenzo-p-dioxin	Air	Pt/kg	32000
Ethane	Air	Pt/kg	32000
Ethane, 1,1,1,2-tetrafluoro-, HFC-134a	Air	Pt/kg	260000
Ethane, 1,2-dichloro-	Air	Pt/kg	32000
Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114	Air	Pt/kg	2000000
Ethane, hexafluoro-, HFC-116	Air	Pt/kg	1840000
Ethanol	Air	Pt/kg	32000
Ethene	Air	Pt/kg	32000
Ethene, chloro-	Air	Pt/kg	32000
Ethylene diamine	Air	Pt/kg	32000
Ethylene oxide	Air	Pt/kg	32000
Ethyne	Air	Pt/kg	32000
Formaldehyde	Air	Pt/kg	32000

Name	Category	Unit	Impact factor
Heptane	Air	Pt/kg	32000
Hexane	Air	Pt/kg	32000
Hydrocarbons, aliphatic, alkanes, cyclic	Air	Pt/kg	32000
Hydrocarbons, aliphatic, alkanes, unspecified	Air	Pt/kg	32000
Hydrocarbons, aliphatic, unsaturated	Air	Pt/kg	32000
Hydrocarbons, aromatic	Air	Pt/kg	32000
Hydrocarbons, chlorinated	Air	Pt/kg	32000
Hydrogen chloride	Air	Pt/kg	46640
Hydrogen fluoride	Air	Pt/kg	84800
Isocyanic acid	Air	Pt/kg	32000
Lead	Air	Pt/kg	2900000
m-Xylene	Air	Pt/kg	32000
Mercury	Air	Pt/kg	120000000
Methane, biogenic	Air	Pt/kg	4200
Methane, bromochlorodifluoro-, Halon 1211	Air	Pt/kg	6000000
Methane, bromotrifluoro-, Halon 1301	Air	Pt/kg	20000000
Methane, chlorodifluoro-, HCFC-22	Air	Pt/kg	300000
Methane, dichloro-, HCC-30	Air	Pt/kg	32000
Methane, dichlorodifluoro-, CFC-12	Air	Pt/kg	2000000
Methane, dichlorofluoro-, HCFC-21	Air	Pt/kg	32000
Methane, fossil	Air	Pt/kg	4200
Methane, monochloro-, R-40	Air	Pt/kg	32000
Methane, tetrachloro-, CFC-10	Air	Pt/kg	32000
Methane, tetrafluoro-, FC-14	Air	Pt/kg	1300000
Methane, trichlorofluoro-, CFC-11	Air	Pt/kg	2000000
Methane, trifluoro-, HFC-23	Air	Pt/kg	2340000
Methanol	Air	Pt/kg	32000
Monoethanolamine	Air	Pt/kg	32000
Nitrate	Air	Pt/kg	67000
Nitrogen oxides	Air	Pt/kg	67000
NMVOC, non-methane volatile organic compounds	Air	Pt/kg	32000
PAH, polycyclic aromatic hydrocarbons	Air	Pt/kg	32000
Particulates, < 2.5 um	Air	Pt/kg	110000
Particulates, > 2.5 um, and < 10um	Air	Pt/kg	110000
Pentane	Air	Pt/kg	32000
Phenol	Air	Pt/kg	32000

Name	Category	Unit	Impact factor
Phenol, pentachloro-	Air	Pt/kg	32000
Polychlorinated biphenyls	Air	Pt/kg	32000
Propanal	Air	Pt/kg	32000
Propane	Air	Pt/kg	32000
Propene	Air	Pt/kg	32000
Propionic acid	Air	Pt/kg	32000
Propylene oxide	Air	Pt/kg	32000
Styrene	Air	Pt/kg	32000
Sulfur dioxide	Air	Pt/kg	53000
Sulfur hexafluoride	Air	Pt/kg	4780000
t-Butyl methyl ether	Air	Pt/kg	32000
Toluene	Air	Pt/kg	32000
Xylene	Air	Pt/kg	32000
Zinc	Air	Pt/kg	520000
Ammonium, ion	Freshwater	Pt/kg	54441
AOX, Adsorbable Organic Halogen as Cl	Freshwater	Pt/kg	330000
Cadmium, ion	Freshwater	Pt/kg	11000000
Chlorinated solvents, unspecified	Freshwater	Pt/kg	330000
Chloroform	Freshwater	Pt/kg	990000
Chromium VI	Freshwater	Pt/kg	660000
Chromium, ion	Freshwater	Pt/kg	660000
COD, Chemical Oxygen Demand	Freshwater	Pt/kg	5900
Copper, ion	Freshwater	Pt/kg	1200000
Dichromate	Freshwater	Pt/kg	165000
DOC, Dissolved Organic Carbon	Freshwater	Pt/kg	17700
Ethane, 1,2-dichloro-	Freshwater	Pt/kg	660000
Ethene, chloro-	Freshwater	Pt/kg	330000
Lead	Freshwater	Pt/kg	150000
Mercury	Freshwater	Pt/kg	240000000
Methane, dichloro-, HCC-30	Freshwater	Pt/kg	660000
Nickel, ion	Freshwater	Pt/kg	190000
Nitrate	Freshwater	Pt/kg	27000
Nitrogen	Freshwater	Pt/kg	69000
Nitrogen, organic bound	Freshwater	Pt/kg	69000
Phosphate	Freshwater	Pt/kg	654000
Phosphorus	Freshwater	Pt/kg	2000000

Name	Category	Unit	Impact factor
TOC, Total Organic Carbon	Freshwater	Pt/kg	17700
Zinc, ion	Freshwater	Pt/kg	210000
Aclonifen	Soil	Pt/kg	800000
Asulam	Soil	Pt/kg	800000
Atrazine	Soil	Pt/kg	800000
Bentazone	Soil	Pt/kg	800000
Cadmium	Soil	Pt/kg	120000000
Carbetamide	Soil	Pt/kg	800000
Chlormequat	Soil	Pt/kg	800000
Chlorothalonil	Soil	Pt/kg	800000
Chlorotoluron	Soil	Pt/kg	800000
Chromium	Soil	Pt/kg	1296000
Chromium VI	Soil	Pt/kg	1296000
Cobalt	Soil	Pt/kg	3840000
Copper	Soil	Pt/kg	1920000
Cypermethrin	Soil	Pt/kg	800000
Cyproconazole	Soil	Pt/kg	800000
Cyprodinil	Soil	Pt/kg	800000
Difenoconazole	Soil	Pt/kg	800000
Dinoseb	Soil	Pt/kg	800000
Ethephon	Soil	Pt/kg	800000
Ethofumesate	Soil	Pt/kg	800000
Fenpiclonil	Soil	Pt/kg	800000
Fenpropimorph	Soil	Pt/kg	800000
Fluazifop-P-butyl	Soil	Pt/kg	800000
Glyphosate	Soil	Pt/kg	800000
Ioxynil	Soil	Pt/kg	800000
Isoproturon	Soil	Pt/kg	800000
Lead	Soil	Pt/kg	2900000
Linuron	Soil	Pt/kg	800000
Mancozeb	Soil	Pt/kg	800000
Mecoprop-P	Soil	Pt/kg	800000
Mercury	Soil	Pt/kg	120000000
Metalaxil	Soil	Pt/kg	800000
Metaldehyde	Soil	Pt/kg	800000
Metamitron	Soil	Pt/kg	800000

Name	Category	Unit	Impact factor
Metolachlor	Soil	Pt/kg	800000
Metribuzin	Soil	Pt/kg	800000
Molybdenum	Soil	Pt/kg	19200000
Napropamide	Soil	Pt/kg	800000
Nickel	Soil	Pt/kg	1920000
Orbencarb	Soil	Pt/kg	800000
Phenmedipham	Soil	Pt/kg	800000
Pirimicarb	Soil	Pt/kg	800000
Tebuconazole	Soil	Pt/kg	800000
Tebutam	Soil	Pt/kg	800000
Teflubenzuron	Soil	Pt/kg	800000
Terbufos	Soil	Pt/kg	800000
Trifluralin	Soil	Pt/kg	800000
Zinc	Soil	Pt/kg	520000
Coal, brown, in ground	Resource	Pt/ kg	9.9
Coal, hard, unspecified, in ground	Resource	Pt/ kg	19.1
Energy, potential, stock, in barrage water	Resource	Pt/MJ	1
Gas, natural, in ground	Resource	Pt/m3	38.3
Oil, crude, in ground	Resource	Pt/kg	45.8
Transformation, to dump site, inert material landfill	Land	Pt/m2	11250000
Transformation, to dump site, residual material landfill	Land	Pt/m2	8000000
Transformation, to dump site, sanitary landfill	Land	Pt/m2	10000000
Transformation, to dump site, slag compartment	Land	Pt/m2	11250000
Uranium, in ground	Land	Pt/kg	560000
Volume occupied, final repository for low-active radioactive waste	Land	Pt/m3	3300000000
Volume occupied, final repository for radioactive waste	Land	Pt/m3	46000000000
Volume occupied, underground deposit	Land	Pt/m3	38400000

Table S9: Environmental interventions and related impact factors used in the Ecoindicator 99 methodology (EI)

Name	Category	Unit	Impact factor
Carbon-14	Air	Pt/Bq	5.47E-06
Cesium-134	Air	Pt/Bq	3.12E-07
Cesium-137	Air	Pt/Bq	3.39E-07
Cobalt-58	Air	Pt/Bq	1.12E-08
Cobalt-60	Air	Pt/Bq	4.17E-07
Hydrogen-3, Tritium	Air	Pt/Bq	3.65E-10
Iodine-129	Air	Pt/Bq	2.45E-05
Iodine-131	Air	Pt/Bq	4.17E-09
Iodine-133	Air	Pt/Bq	2.45E-10
Krypton-85	Air	Pt/Bq	3.65E-12
Lead-210	Air	Pt/Bq	3.91E-08
Plutonium-238	Air	Pt/Bq	1.74E-06
Plutonium-alpha	Air	Pt/Bq	2.16E-06
Polonium-210	Air	Pt/Bq	3.91E-08
Radium-226	Air	Pt/Bq	2.37E-08
Radon-222	Air	Pt/Bq	6.25E-10
Thorium-230	Air	Pt/Bq	1.17E-06
Uranium-234	Air	Pt/Bq	2.53E-06
Uranium-235	Air	Pt/Bq	5.47E-07
Uranium-238	Air	Pt/Bq	2.14E-07
Xenon-133	Air	Pt/Bq	3.65E-12
Xenon-133m	Air	Pt/Bq	3.65E-12
Acetaldehyde	Air	Pt/kg	4.10E-02
Acetic acid	Air	Pt/kg	5.55E-03
Acetone	Air	Pt/kg	5.31E-03
Acrolein	Air	Pt/kg	4.43E-02
Aldehydes, unspecified	Air	Pt/kg	3.65E-02
Ammonia	Air	Pt/kg	3.43E+00
Arsenic	Air	Pt/kg	6.87E+02
Benzaldehyde	Air	Pt/kg	3.65E-02
Benzene	Air	Pt/kg	7.75E-02
Benzene, ethyl-	Air	Pt/kg	3.98E-02
Benzene, hexachloro-	Air	Pt/kg	2.15E+03

Name	Category	Unit	Impact factor
Benzene, pentachloro-	Air	Pt/kg	5.47E-02
Benzo(a)pyrene	Air	Pt/kg	1.15E+02
Butadiene	Air	Pt/kg	4.60E-01
Butane	Air	Pt/kg	3.61E-02
Butene	Air	Pt/kg	6.43E-02
Cadmium	Air	Pt/kg	4.27E+03
Carbon dioxide, fossil	Air	Pt/kg	5.47E-03
Carbon monoxide, fossil	Air	Pt/kg	8.38E-03
Chloroform	Air	Pt/kg	7.08E-01
Chromium	Air	Pt/kg	3.22E+02
Chromium VI	Air	Pt/kg	4.74E+02
Copper	Air	Pt/kg	1.14E+02
Cumene	Air	Pt/kg	2.89E-02
Dinitrogen monoxide	Air	Pt/kg	1.80E+00
Dioxins, measured as 2,3,7,8-tetrachlorodibenzo-p-dioxin	Air	Pt/kg	4.67E+06
Ethane	Air	Pt/kg	6.87E-03
Ethane, 1,1,1,2-tetrafluoro-, HFC-134a	Air	Pt/kg	7.03E+00
Ethane, 1,2-dichloro-	Air	Pt/kg	7.85E-01
Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114	Air	Pt/kg	8.01E+01
Ethane, hexafluoro-, HFC-116	Air	Pt/kg	5.21E+01
Ethanol	Air	Pt/kg	2.17E-02
Ethene	Air	Pt/kg	5.55E-02
Ethene, chloro-	Air	Pt/kg	5.44E-03
Ethylene diamine	Air	Pt/kg	3.33E-02
Ethylene oxide	Air	Pt/kg	4.77E+00
Ethyne	Air	Pt/kg	4.87E-03
Fluorine	Air	Pt/kg	2.89E-02
Formaldehyde	Air	Pt/kg	5.47E-02
Heptane	Air	Pt/kg	2.89E-02
Hexane	Air	Pt/kg	2.66E-02
Hydrocarbons, aliphatic, alkanes, cyclic	Air	Pt/kg	3.33E-02
Hydrocarbons, aliphatic, alkanes, unspecified	Air	Pt/kg	1.95E-02
Hydrocarbons, aliphatic, unsaturated	Air	Pt/kg	5.47E-02
Hydrocarbons, aromatic	Air	Pt/kg	5.47E-02
Hydrocarbons, chlorinated	Air	Pt/kg	9.11E-03

Name	Category	Unit	Impact factor
Lead	Air	Pt/kg	1.98E+02
Mercury	Air	Pt/kg	6.47E+01
Methane	Air	Pt/kg	1.15E-01
Methane, bromochlorodifluoro-, Halon 1211	Air	Pt/kg	1.47E+02
Methane, bromotrifluoro-, Halon 1301	Air	Pt/kg	1.43E+02
Methane, chlorodifluoro-, HCFC-22	Air	Pt/kg	8.39E+00
Methane, dichloro-, HCC-30	Air	Pt/kg	6.46E-02
Methane, dichlorodifluoro-, CFC-12	Air	Pt/kg	5.89E+01
Methane, dichlorofluoro-, HCFC-21	Air	Pt/kg	2.25E+00
Methane, monochloro-, R-40	Air	Pt/kg	5.50E-01
Methane, tetrachloro-, CFC-10	Air	Pt/kg	4.79E+01
Methane, tetrafluoro-, FC-14	Air	Pt/kg	3.65E+01
Methane, trichlorofluoro-, CFC-11	Air	Pt/kg	3.31E+01
Methane, trifluoro-, HFC-23	Air	Pt/kg	6.77E+01
Methanol	Air	Pt/kg	7.32E-03
Monoethanolamine	Air	Pt/kg	3.33E-02
m-Xylene	Air	Pt/kg	6.20E-02
Nickel	Air	Pt/kg	5.55E+02
Nitrate	Air	Pt/kg	4.46E-01
Nitrogen oxides	Air	Pt/kg	2.76E+00
NMVOC, non-methane volatile organic compounds	Air	Pt/kg	3.33E-02
PAH, polycyclic aromatic hydrocarbons	Air	Pt/kg	4.48E+00
Paraffins	Air	Pt/kg	3.33E-02
Particulates, < 2.5 um	Air	Pt/kg	1.85E+01
Particulates, > 2.5 um, and < 10um	Air	Pt/kg	9.77E+00
Pentane	Air	Pt/kg	2.22E-02
Phenol	Air	Pt/kg	5.47E-02
Phenol, pentachloro-	Air	Pt/kg	1.89E+02
Polychlorinated biphenyls	Air	Pt/kg	5.76E+01
Propanal	Air	Pt/kg	4.43E-02
Propane	Air	Pt/kg	2.64E-02
Propene	Air	Pt/kg	6.20E-02
Propionic acid	Air	Pt/kg	8.41E-03
Propylene oxide	Air	Pt/kg	3.05E-01
Sodium dichromate	Air	Pt/kg	1.88E+02

Name	Category	Unit	Impact factor
Styrene	Air	Pt/kg	6.35E-04
Sulfate	Air	Pt/kg	1.50E+00
Sulfur dioxide	Air	Pt/kg	1.50E+00
Sulfur hexafluoride	Air	Pt/kg	1.38E+02
t-Butyl methyl ether	Air	Pt/kg	8.65E-03
Toluene	Air	Pt/kg	3.54E-02
Xylene	Air	Pt/kg	5.75E-02
Zinc	Air	Pt/kg	2.25E+02
Antimony-124	Water	Pt/Bq	2.14E-08
Cesium-134	Water	Pt/Bq	3.65E-06
Cesium-137	Water	Pt/Bq	2.02E-08
Cobalt-58	Water	Pt/Bq	1.07E-09
Cobalt-60	Water	Pt/Bq	1.15E-06
Hydrogen-3, Tritium	Water	Pt/Bq	2.75E-12
Iodine-131	Water	Pt/Bq	1.30E-08
Manganese-54	Water	Pt/Bq	8.07E-09
Radium-226	Water	Pt/Bq	3.39E-09
Silver-110	Water	Pt/Bq	1.33E-08
Strontium-90	Water	Pt/Bq	1.34E-12
Uranium-234	Water	Pt/Bq	6.25E-08
Uranium-235	Water	Pt/Bq	5.99E-08
Uranium-238	Water	Pt/Bq	9.86E-10
Arsenic, ion	Water	Pt/kg	1.71E+03
Benzene	Water	Pt/kg	1.11E-01
Cadmium, ion	Water	Pt/kg	1.89E+03
Chloroform	Water	Pt/kg	6.77E-01
Chromium VI	Water	Pt/kg	5.36E+00
Chromium, ion	Water	Pt/kg	5.36E+00
Copper, ion	Water	Pt/kg	1.15E+01
Dichromate	Water	Pt/kg	2.58E+00
Dioxins, measured as 2,3,7,8-tetrachlorodibenzo-p-dioxin	Water	Pt/kg	5.26E+07
Ethane, 1,2-dichloro-	Water	Pt/kg	7.76E-01
Ethene, chloro-	Water	Pt/kg	7.40E-03
Ethylene oxide	Water	Pt/kg	3.62E+00
Formaldehyde	Water	Pt/kg	1.29E-01

Name	Category	Unit	Impact factor
Lead	Water	Pt/kg	5.76E-01
Mercury	Water	Pt/kg	1.54E+01
Methane, dichloro-, HCC-30	Water	Pt/kg	1.29E-02
Nickel, ion	Water	Pt/kg	1.12E+01
PAH, polycyclic aromatic hydrocarbons	Water	Pt/kg	6.77E+01
Propylene oxide	Water	Pt/kg	4.53E-01
Toluene	Water	Pt/kg	1.35E-02
Zinc, ion	Water	Pt/kg	1.27E+00
Arsenic	Soil	Pt/kg	4.19E+02
Atrazine	Soil	Pt/kg	3.42E+01
Bentazone	Soil	Pt/kg	7.08E-01
Cadmium	Soil	Pt/kg	5.63E+04
Chromium	Soil	Pt/kg	3.18E+02
Chromium VI	Soil	Pt/kg	3.31E+02
Copper	Soil	Pt/kg	1.17E+02
Lead	Soil	Pt/kg	1.01E+00
Mecoprop-P	Soil	Pt/kg	8.11E-03
Mercury	Soil	Pt/kg	1.31E+02
Metamitron	Soil	Pt/kg	3.63E+00
Metribuzin	Soil	Pt/kg	4.91E+01
Nickel	Soil	Pt/kg	5.71E+02
Trifluralin	Soil	Pt/kg	6.52E+01
Zinc	Soil	Pt/kg	2.25E+02
Aluminium, 24% in bauxite, 11% in crude ore, in ground	Resource	Pt/kg	5.66E-02
Chromium, 25.5 in chromite, 11.6% in crude ore, in ground	Resource	Pt/kg	2.18E-02
Cinnabar, in ground	Resource	Pt/kg	3.94E+00
Coal, hard, unspecified, in ground	Resource	Pt/kg	3.93E-03
Copper, 0.99% in sulfide, Cu 0.36% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	8.73E-01
Copper, 1.18% in sulfide, Cu 0.39% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	8.73E-01
Copper, 1.42% in sulfide, Cu 0.81% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	8.73E-01
Copper, 2.19% in sulfide, Cu 1.83% and Mo 8.2E-3% in crude ore, in ground	Resource	Pt/kg	8.73E-01

Name	Category	Unit	Impact factor
Gas, mine, off-gas, process, coal mining/m3	Resource	Pt/m3	1.28E-01
Gas, natural, in ground	Resource	Pt/m3	1.23E-01
Iron, 46% in ore, 25% in crude ore, in ground	Resource	Pt/kg	1.21E-03
Lead, 5%, in sulfide, Pb 2.97% and Zn 5.34% in crude ore, in ground	Resource	Pt/kg	1.75E-01
Manganese, 35.7% in sedimentary deposit, 14.2% in crude ore, in ground	Resource	Pt/kg	7.45E-03
Mercury, in ground	Resource	Pt/kg	3.94E+00
Molybdenum, 0.010% in sulfide, Mo 8.2E-3% and Cu 1.83% in crude ore, in ground	Resource	Pt/kg	9.76E-01
Molybdenum, 0.014% in sulfide, Mo 8.2E-3% and Cu 0.81% in crude ore, in ground	Resource	Pt/kg	9.76E-01
Molybdenum, 0.022% in sulfide, Mo 8.2E-3% and Cu 0.36% in crude ore, in ground	Resource	Pt/kg	9.76E-01
Molybdenum, 0.025% in sulfide, Mo 8.2E-3% and Cu 0.39% in crude ore, in ground	Resource	Pt/kg	9.76E-01
Molybdenum, 0.11% in sulfide, Mo 4.1E-2% and Cu 0.36% in crude ore, in ground	Resource	Pt/kg	9.76E-01
Nickel, 1.13% in sulfide, Ni 0.76% and Cu 0.76% in crude ore, in ground	Resource	Pt/kg	5.65E-01
Nickel, 1.98% in silicates, 1.04% in crude ore, in ground	Resource	Pt/kg	5.65E-01
Oil, crude, in ground	Resource	Pt/kg	1.48E-01
Tin, 79% in cassiterite, 0.1% in crude ore, in ground	Resource	Pt/kg	1.43E+01
Zinc 9%, in sulfide, Zn 5.34% and Pb 2.97% in crude ore, in ground	Resource	Pt/kg	9.73E-02
Occupation, arable, non-irrigated	Land	Pt/m2.yr	8.97E-02
Occupation, construction site	Land	Pt/m2.yr	6.55E-02
Occupation, dump site	Land	Pt/m2.yr	6.55E-02
Occupation, forest, intensive	Land	Pt/m2.yr	8.58E-03
Occupation, forest, intensive, normal	Land	Pt/m2.yr	8.58E-03
Occupation, industrial area	Land	Pt/m2.yr	6.55E-02
Occupation, industrial area, built up	Land	Pt/m2.yr	8.97E-02
Occupation, industrial area, vegetation	Land	Pt/m2.yr	6.55E-02
Occupation, mineral extraction site	Land	Pt/m2.yr	6.55E-02
Occupation, pasture and meadow, extensive	Land	Pt/m2.yr	7.96E-02
Occupation, pasture and meadow, intensive	Land	Pt/m2.yr	8.81E-02

Name	Category	Unit	Impact factor
Occupation, permanent crop, fruit, intensive	Land	Pt/m2.yr	8.97E-02
Occupation, shrub land, sclerophyllous	Land	Pt/m2.yr	8.58E-03
Occupation, traffic area, rail embankment	Land	Pt/m2.yr	6.55E-02
Occupation, traffic area, rail network	Land	Pt/m2.yr	6.55E-02
Occupation, traffic area, road embankment	Land	Pt/m2.yr	6.55E-02
Occupation, traffic area, road network	Land	Pt/m2.yr	6.55E-02
Occupation, urban, discontinuously built	Land	Pt/m2.yr	7.49E-02
Transformation, from arable	Land	Pt/m2	-2.68E+00
Transformation, from arable, non-irrigated	Land	Pt/m2	-2.68E+00
Transformation, from arable, non-irrigated, fallow	Land	Pt/m2	-2.68E+00
Transformation, from dump site, inert material landfill	Land	Pt/m2	-1.96E+00
Transformation, from dump site, residual material landfill	Land	Pt/m2	-1.96E+00
Transformation, from dump site, sanitary landfill	Land	Pt/m2	-1.96E+00
Transformation, from dump site, slag compartment	Land	Pt/m2	-1.96E+00
Transformation, from forest	Land	Pt/m2	-2.57E-01
Transformation, from forest, extensive	Land	Pt/m2	-2.57E-01
Transformation, from industrial area	Land	Pt/m2	-1.96E+00
Transformation, from industrial area, benthos	Land	Pt/m2	-2.24E+00
Transformation, from industrial area, built up	Land	Pt/m2	-2.68E+00
Transformation, from industrial area, vegetation	Land	Pt/m2	-1.96E+00
Transformation, from mineral extraction site	Land	Pt/m2	-1.96E+00
Transformation, from pasture and meadow	Land	Pt/m2	-2.39E+00
Transformation, from pasture and meadow, extensive	Land	Pt/m2	-2.39E+00
Transformation, from pasture and meadow, intensive	Land	Pt/m2	-2.65E+00
Transformation, from sea and ocean	Land	Pt/m2	-2.24E+00
Transformation, from shrub land, sclerophyllous	Land	Pt/m2	-2.57E-01
Transformation, from unknown	Land	Pt/m2	-2.24E+00
Transformation, to arable	Land	Pt/m2	2.68E+00
Transformation, to arable, non-irrigated	Land	Pt/m2	2.68E+00
Transformation, to arable, non-irrigated, fallow	Land	Pt/m2	2.68E+00
Transformation, to dump site	Land	Pt/m2	1.96E+00
Transformation, to dump site, benthos	Land	Pt/m2	2.24E+00
Transformation, to dump site, inert material landfill	Land	Pt/m2	1.96E+00
Transformation, to dump site, residual material landfill	Land	Pt/m2	1.96E+00
Transformation, to dump site, sanitary landfill	Land	Pt/m2	1.96E+00

Name	Category	Unit	Impact factor
Transformation, to dump site, slag compartment	Land	Pt/m2	1.96E+00
Transformation, to forest	Land	Pt/m2	2.57E-01
Transformation, to forest, intensive	Land	Pt/m2	2.57E-01
Transformation, to forest, intensive, normal	Land	Pt/m2	2.57E-01
Transformation, to heterogeneous, agricultural	Land	Pt/m2	2.68E+00
Transformation, to industrial area	Land	Pt/m2	1.96E+00
Transformation, to industrial area, benthos	Land	Pt/m2	2.24E+00
Transformation, to industrial area, built up	Land	Pt/m2	2.68E+00
Transformation, to industrial area, vegetation	Land	Pt/m2	1.96E+00
Transformation, to mineral extraction site	Land	Pt/m2	1.96E+00
Transformation, to pasture and meadow	Land	Pt/m2	2.39E+00
Transformation, to pasture and meadow, extensive	Land	Pt/m2	2.39E+00
Transformation, to pasture and meadow, intensive	Land	Pt/m2	2.65E+00
Transformation, to permanent crop, fruit, intensive	Land	Pt/m2	2.68E+00
Transformation, to sea and ocean	Land	Pt/m2	2.24E+00
Transformation, to shrub land, sclerophyllous	Land	Pt/m2	2.57E-01
Transformation, to traffic area, rail embankment	Land	Pt/m2	1.96E+00
Transformation, to traffic area, rail network	Land	Pt/m2	1.96E+00
Transformation, to traffic area, road embankment	Land	Pt/m2	1.96E+00
Transformation, to traffic area, road network	Land	Pt/m2	1.96E+00
Transformation, to unknown	Land	Pt/m2	2.24E+00
Transformation, to urban, discontinuously built	Land	Pt/m2	2.24E+00
Transformation, to water bodies, artificial	Land	Pt/m2	2.24E+00
Transformation, to water courses, artificial	Land	Pt/m2	2.24E+00

Table S10: Regression results for the individual commodity groups applying the default life cycle inventory selection

logEF = a.logCED + b	**a**	**b**	**r2**	**SE**	**n**
agricultural products	1.0	-0.9	0.40	0.41	65
paper+cardboard	1.2	-1.0	0.86	0.11	29
organic chemicals	1.0	-0.9	0.76	0.19	146
metals	1.0	-0.8	0.99	0.09	51
glass	1.0	-0.7	1.00	0.05	11
inorganic chemicals	1.0	-0.7	0.97	0.13	123
plastics	0.8	-0.6	0.21	0.23	33
construction materials	0.7	-0.4	0.73	0.29	40
all	0.9	-0.7	0.88	0.25	499
logCEENE = a.logCED + b	**a**	**b**	**r2**	**SE**	**n**
agricultural products	1.0	0.6	0.36	0.44	65
paper+cardboard	2.3	-1.4	0.88	0.20	29
organic chemicals	0.9	0.3	0.72	0.20	146
metals	1.0	0.2	0.98	0.16	51
glass	1.0	0.1	0.98	0.11	11
inorganic chemicals	0.8	0.4	0.90	0.21	123
plastics	1.0	0.0	0.91	0.05	33
construction materials	0.9	0.2	0.92	0.18	40
all	0.9	0.4	0.83	0.30	499
logCF = a.logCED + b	**a**	**b**	**r2**	**SE**	**n**
agricultural products	1.1	-1.9	0.42	0.41	65
paper+cardboard	-0.1	0.0	0.01	0.17	29
organic chemicals	0.8	-1.2	0.70	0.20	146
metals	1.0	-1.2	0.98	0.16	51
glass	1.0	-1.2	0.99	0.07	11
inorganic chemicals	1.0	-1.3	0.93	0.21	123
plastics	3.0	-5.1	0.67	0.31	33
construction materials	0.8	-0.9	0.60	0.38	40
all	1.0	-1.3	0.82	0.33	499
logEPS = a.logCED + b	**a**	**b**	**r2**	**SE**	**n**
agricultural products	1.0	-1.9	0.47	0.35	65
paper+cardboard	0.1	-0.5	0.05	0.15	29

organic chemicals	0.9	-1.4	0.85	0.14	146
metals	1.1	-0.6	0.62	1.04	51
glass	0.9	-1.3	0.97	0.11	11
inorganic chemicals	0.8	-0.8	0.59	0.49	123
plastics	2.1	-3.6	0.69	0.21	33
construction materials	0.9	-1.3	0.73	0.35	40
all	1.1	-1.4	0.61	0.63	499
logES = a.logCED + b	**a**	**b**	**r2**	**SE**	**n**
agricultural products	1.0	1.8	0.40	0.41	65
paper+cardboard	0.5	2.3	0.60	0.09	29
organic chemicals	0.8	1.8	0.62	0.24	146
metals	0.9	2.3	0.85	0.46	51
glass	0.9	2.0	0.98	0.09	11
inorganic chemicals	0.8	2.2	0.77	0.33	123
plastics	2.3	-1.0	0.57	0.30	33
construction materials	0.9	1.8	0.78	0.28	40
all	0.9	1.9	0.75	0.38	499
logEI99 = a.logCED + b	**a**	**b**	**r2**	**SE**	**n**
agricultural products	1.1	-2.2	0.47	0.36	65
paper+cardboard	0.6	-2.0	0.59	0.12	29
organic chemicals	0.9	-2.1	0.75	0.18	146
metals	0.9	-1.7	0.84	0.45	51
glass	0.9	-2.2	0.98	0.08	11
inorganic chemicals	0.8	-2.0	0.75	0.34	123
plastics	1.5	-3.4	0.83	0.11	33
construction materials	1.0	-2.4	0.88	0.23	40
all	0.9	-2.1	0.81	0.33	499

a = slope; b = intercept; r2 = explained variance; SE = Standard Error; n = number of observations.